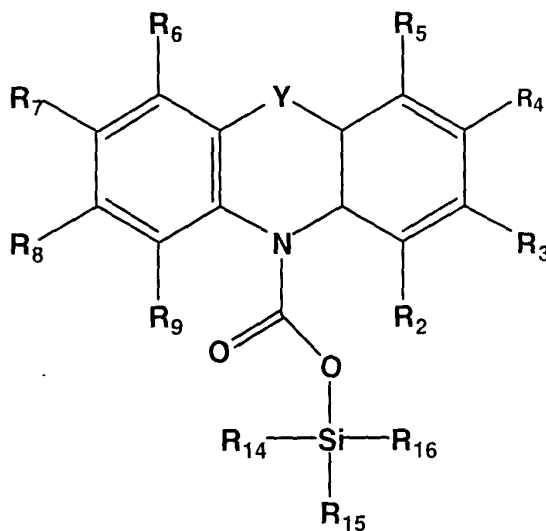


CLAIMS

What is claimed is:

1. A compound of formula I:

(I)



wherein

Y is O, S, Se, CR₁₇R₁₈, NR₁₃, wherein R₁₃, R₁₇, R₁₈ is each independently selected from hydrogen, C₁-C₃ alkyl and substituted aryl groups and unsubstituted aryl groups;

R₂, R₅, R₆, and R₉ each is independently selected from hydrogen, halogen, C₁-C₆ alkyl, C₁-C₆ alkoxy, aryl, nitro, azo and fused aromatic groups;

R₃, R₄, R₇, and R₈ each is independently selected from NR₁₀R₁₁, OR₁₂, hydrogen, alkyl, aryl, azo, and fused aromatic groups; and

R₁₀, R₁₁, R₁₂, R₁₄, R₁₅ and R₁₆ each is independently selected from hydrogen, unsubstituted C₁-C₆ alkyl, substituted C₁-C₆ alkyl, unsubstituted C₁-C₆ alkoxy, and substituted C₁-C₆ alkoxy, benzyl or aryl groups.

2. The compound of claim 1, wherein Y is S.
3. The compound of claim 1, wherein R₄ is selected from NR₁₀R₁₁ and OR₁₂.
4. The compound of claim 1, wherein R₇ is selected from NR₁₀R₁₁ and OR₁₂.
5. The compound of claim 1, wherein Y is S; R₄ and R₇ is NR₁₀R₁₁; and R₂, R₃, R₅, R₆, R₈, and R₉ each is independently selected from hydrogen, halogen, alkyl, aryl, nitro, and fused aromatic groups.
6. The compound of claim 5, wherein R₁₄, R₁₅ and R₁₆ is each independently selected from hydrogen, unsubstituted C₁-C₆ alkyl, substituted C₁-C₆ alkyl, unsubstituted C₁-C₆ alkoxy, and substituted C₁-C₆ alkoxy.
7. The compound of claim 6, wherein R₁₄, R₁₅ and R₁₆ is each independently selected from methyl, ethyl, *n*-propyl and isopropyl.
8. The compound of claim 7, wherein R₁₄, R₁₅ and R₁₆ is isopropyl.
9. The compound of claim 8, wherein R₂, R₃, R₅, R₆, R₈, and R₉ each is hydrogen; R₁₀ and R₁₁ each is methyl.
10. The compound of claim 1, wherein Y is O.
11. The compound of claim 10, wherein R₄ is selected from NR₁₀R₁₁ and OR₁₂.
12. The compound of claim 10, wherein R₇ is selected from NR₁₀R₁₁ and OR₁₂.
13. The compound of claim 10, wherein Y is O; R₄ and R₇ is NR₁₀R₁₁; and R₂, R₃, R₅, R₆, R₈, and R₉ each is independently selected from hydrogen, halogen, alkyl, aryl, nitro, and fused aromatic groups.

14. The compound of claim 13, wherein R_{14} , R_{15} and R_{16} is each independently selected from hydrogen, unsubstituted C_1 - C_6 alkyl, substituted C_1 - C_6 alkyl, unsubstituted C_1 - C_6 alkoxy, and substituted C_1 - C_6 alkoxy.

15. The compound of claim 14, wherein R_{14} , R_{15} and R_{16} is each independently selected from methyl, ethyl, *n*-propyl and isopropyl.

16. The compound of claim 15, wherein R_{14} , R_{15} and R_{16} is isopropyl.

17. The compound of claim 16, wherein R_2 , R_3 , R_5 , R_6 , R_8 , and R_9 each is hydrogen; R_{10} and R_{11} each is methyl.

18. The compound of claim 1, wherein Y is N.

19. The compound of claim 18, wherein R_4 is selected from $NR_{10}R_{11}$ and OR_{12} .

20. The compound of claim 18, wherein R_7 is selected from $NR_{10}R_{11}$ and OR_{12} .

21. The compound of claim 18, wherein Y is N; R_4 and R_7 is $NR_{10}R_{11}$; and R_2 , R_3 , R_5 , R_6 , R_8 , and R_9 each is independently selected from hydrogen, halogen, alkyl, aryl, nitro, and fused aromatic groups.

22. The compound of claim 21, wherein R_{14} , R_{15} and R_{16} is each independently selected from hydrogen, unsubstituted C_1 - C_6 alkyl, substituted C_1 - C_6 alkyl, unsubstituted C_1 - C_6 alkoxy, and substituted C_1 - C_6 alkoxy.

23. The compound of claim 22, wherein R_{14} , R_{15} and R_{16} is each independently selected from methyl, ethyl, *n*-propyl and isopropyl.

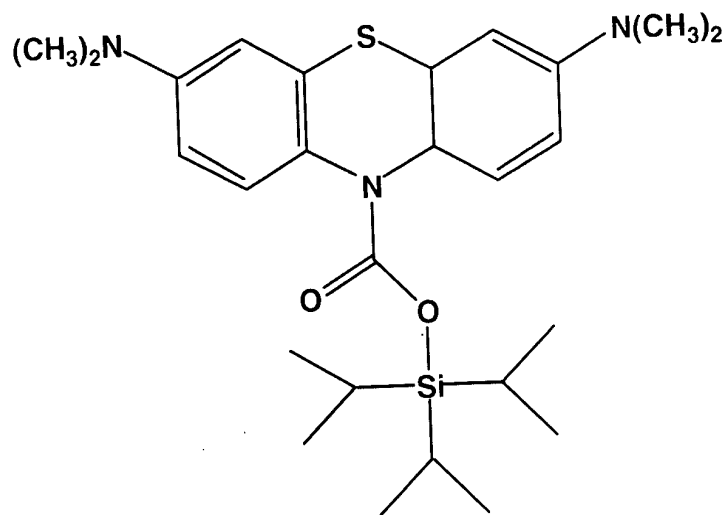
24. The compound of claim 23, wherein R_{14} , R_{15} and R_{16} is isopropyl.

25. The compound of claim 24, wherein R_2 , R_3 , R_5 , R_6 , R_8 , and R_9 each is hydrogen;

R₁₀ and R₁₁ each is methyl.

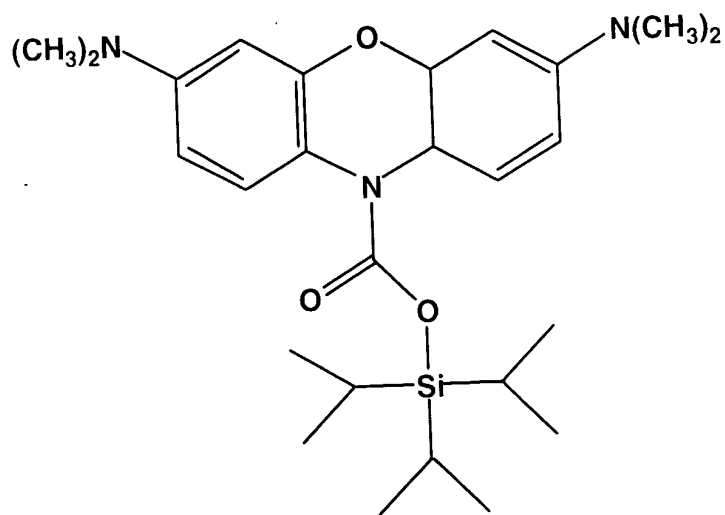
26. A compound of formula II:

(II)

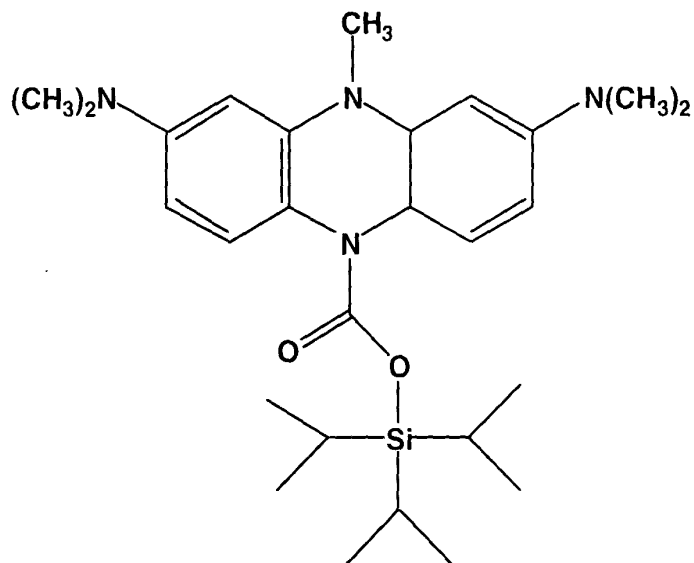


27. A compound of formula III:

(III)



(IV)



a first substrate and a second substrate, wherein at least one of said first substrate and said second substrate has information encoding features;

a bonding layer between said first and said second substrates;

wherein said bonding layer transforms from a transparent state to an opaque state and comprises:

a carrier material, wherein said carrier material comprises at least one of thermoplastic acrylic polymers, polyester resins, epoxy resins, polythiolenes,

ultraviolet cured organic resins, polyurethanes, thermosettable acrylic polymers, alkyds, vinyl resins, and combinations thereof;

a reactive material, wherein said reactive material comprises a reduced form of at least one dye selected from azines, oxazines, thiazines, leuco-azines, quinoneimines, indamines, indophenols, indoanilines, anthraquinones, acridines, diarylmethane, triarylmethane and combinations thereof; and

a photostabilizing material, wherein said photostabilizing material comprises at least one polymeric phenol material.